



### 5.4.6 Hazardous Materials Incidents

#### History

Hazardous material releases are a significant concern in Arizona. The Arizona Emergency Response Commission (AZSERC) tracks information on declared hazardous material events. This information comes from the responsible party reports to the National Response Center (NRC) and from reports from responding agencies to the Commission.

Local responders, LEPCs and the AZSERC assess reports to ensure appropriate follow-up actions and to assess recurring issues.

During the past decade, from review of significant reports and from AZSERC sponsored Hazardous Materials Commodity Flow studies, it is apparent that flammables, corrosives and gases are the primary hazardous materials of concern and have been receiving the attention of planners and responders to ensure preparedness. For details or review of any materials surrounding reported releases, the reader should feel free to contact the AZSERC. The following table is characteristic of incidents per county versus population density:

Characteristics of Hazardous Materials Incidents Per County vs Population Density, July 2005 – June 2006							
County	TIER Two Form R RMP  Facilities				Population  (W/O Tribal)	Incidents  Reported/10,000 (Facility)/(Population/ 10,000)	
	Tier Two	Form R	RMP	Total		#	
Apache	43	1	1	45	21,350	0	0.0
Cochise	74	7	5	86	106,857	11	1.0
Coconino	133	5	9	147	186,291	12	0.6
Gila	64	6	1	71	68,602	10	1.5
Graham	20	0	1	21	18,937	2	1.1
Greenlee	9	1	3	13	8,300	4	4.8
La Paz	43	1	5	49	44,055	7	1.6
Maricopa	1772	219	184	2175	3,641,750	47	0.1
Mohave	138	7	16	161	188,952	18	1.0
Navajo	83	3	1	87	48,460	4	0.8
Pima	381	52	16	449	946,138	17	0.2
Pinal	152	10	16	178	204,338	11	0.5
Santa Cruz	38	3	2	43	30,938	6	1.9
Yavapai	116	7	0	123	131,790	5	0.4
Yuma	150	11	36	197	237,407	11	0.5
<b>Total</b>	<b>3216</b>	<b>333</b>	<b>296</b>	<b>3845</b>	<b>5,884,165</b>	<b>165</b>	<b>0.3</b>

Source: Arizona Emergency Response Commission, June 2007.

Recent undeclared hazardous materials incidents, include the following notable events

- February 28, 1994, an Air National Guard F-16 jet crashed near Duncan, killing the pilot and released hydrazine.
- May 21, 1999, a chlorine release at the Arizona State Prison in Fort Grant injured one person.
- September 25, 1999, twelve people were injured by a chlorine leak in Nogales.
- May 15, 2000, three people were injured by a chlorine release in Phoenix.



- August 2, 2000, a major fire at a warehouse in Phoenix resulted in five injuries due to chlorine and an estimated \$100 million in damages. The fire, extinguished the next day, required four alarms and numerous special apparatus. 80+ civilians were evacuated from the surrounding neighborhood and several fire fighters and police officers were treated for smoke inhalation. The fire destroyed the 85,000 sq. ft. warehouse. A portion of the building was a home and garden supply business which stored oxidizers (e.g., chlorine), fertilizers, and pesticides (National Fire Protection Assoc. 2000).
- July 17, 2001, the release of chlorine at the Pima County Waste Water Plant injured one person.

Maricopa County had nearly half of the EHS incidents reported to the NRC during the period 1990-2000. This is not surprising given the overall level of development in Maricopa County, particularly the concentration of industry and major infrastructure.

The AZSERC maintains records on facilities that manufacture, process, or otherwise use hazardous materials over certain quantities. For Extremely Hazardous Substances (EHS), unless otherwise exempted from reporting (for example, household products or products packaged for use by the consumer or agricultural use chemicals), facilities must report at 500 pounds or the threshold planning quantity for that EHS. Those reports are submitted to the AZSERC, Local Emergency Planning Committee (LEPC) (in Arizona, each County has one Local Emergency Planning District), and to the Fire Department with jurisdiction.

It can easily be understood that hazardous chemicals therefore exist at facilities that are NOT subject to reporting under this one environmental/emergency management statute and may exist in quantities that subject the facility, workers, and community to vulnerabilities. It must also be recognized that there are well over 500,000 chemicals that are required to be reported under this one law as well as recognize that exemptions exist that remove statutory requirements to report to the AZSERC. Further, while there are planning requirements for EHS, in many cases non-EHS may pose a more significant threat because of quantity location, storage, proximity to sensitive areas, etc.

Hazardous materials planning must be an integral part of preparedness, response, recovery and mitigation planning and will undoubtedly be part of emergency management considerations for all possible disaster/emergencies, whether technological or natural.

Facilities submitting reports are heavily concentrated, as you would imagine, in the urban areas of Maricopa County and Pima County (Tucson). Pinal and Yuma Counties also have significant numbers of facilities subject to the Emergency Planning and Community Right to Know laws. Several Local Emergency Planning District (Counties) are close behind.

It must be noted that this is but one source of information on Hazardous Materials. Local jurisdictions, through their fire codes, maintain additional information and recently passed (May, 2007) Arizona legislation tasks jurisdictions of 75,000 people or greater to develop a management program to maintain listings of building in which hazardous materials are stored. The Department of Environmental Quality, Department of Health Services, Arizona Radiation Regulatory Agency, the Arizona Counter-Terrorism Information Center, Federal Bureau of Investigation, Bureau of Alcohol, Tobacco and Firearms also maintain significant information regarding facilities with hazardous materials.

The AZSERC has, over the past decade, performed a number of hazardous materials commodity flow studies to support local jurisdictions in the understanding of what transits their jurisdictions by road and rail. The prevalent commodities are gases, flammables and corrosives and while transportation has been relatively safe, there are accidents. Flammables and corrosives are the products that appear to be most heavily involved in these infrequent accidents.

Because of security considerations and because this Plan is not a controlled plan, the maps that would normally be included are not being included nor are listings of facilities subject to reporting under the Emergency Planning and Community Right to Know Act. That information, on request, is available through the Commission and members of the Commission staff support operations at the State Operations Center, when activated, to provide information on what may or may not be in/near disaster impacted areas. LEPCs are tasked to develop plans that address their respective facilities of concern and provide outreach to the public regarding procedures to be followed in the event of a chemical release.



## Map 26

Describes Extremely Hazardous Substance (EHS) incidents that have occurred through 2006 based on reporting to the National Response Center. EHS is defined as Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), also known as the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), establishes a program designed to encourage state and local planning and preparedness for spills and releases of extremely hazardous substances (EHS). Under Section 302 of SARA, EPA developed a list of extremely hazardous substances and established threshold planning quantities (TPQs) for each of these substances. Facilities that have present an EHS in excess of its TPQ must notify its state emergency response commission and participate, as necessary, with the local emergency planning committee in the local emergency planning process.

## Probability and Magnitude

Comprehensive information on the probability and magnitude of hazardous material events across all types of sources (e.g., fixed facility, transport vehicle) is not available. Wide variations in the characteristics of hazardous material sources and between the materials themselves make such an evaluation very difficult. The probability and magnitude of hazardous materials incidents would best be resourced through the EPA's Risk Management Planning documents/off-site consequence analysis which is available at the AZSERC and at EPA and is shared with the LEPCs but is not made public because of regulatory constraints. A citizen can obtain information by following the guidelines established by EPA and the Department of Justice.

The US Department of Transportation's Hazardous Materials Transportation Program is one of the most advanced probability and magnitude estimation programs. The program collects information on unintentional releases of hazardous materials, including the consequences, and analyzes them. One of the major efforts of the program is to identify low probability, high consequence events (which may not be apparent from incident data) and providing appropriate levels of protection (DOT, September 2003).

While it is beyond the scope of this Plan to evaluate the probability and magnitude of hazardous material events in Arizona in detail, it is possible to determine the exposure of population, buildings, and critical facilities should such an event occur. The starting point for this analysis is the approximately 3,300 facilities in Arizona that were required in 2007 under EPCRA to file a Tier II Hazardous Materials Chemical Inventory Report because of the presence of hazardous materials. Of these facilities in Arizona, 1,000 facilities were identified as having EHS. Major concentrations of chemical facilities are to be found in Maricopa, Pima, and Pinal counties.

While there have been two major chemical incidents in the greater Phoenix metropolitan area in the last two decades, the greater probability, because of strides taken to minimize potentials for release from a facility (e.g. Risk Management Planning requirements of the Clean Air Act Amendments and OSHA's Chemical Process Safety Managements Standard of 29 CFR 1910.119), rests with transportation related incidents involving flammables (gasoline) and corrosives (sulfuric acid).

In an attempt to categorize the probability of future events of hazardous materials incidents, the hazard was analyzed using the CPRI. This method also takes into account the levels of magnitude/severity, warning time and duration. In Arizona, hazardous materials incidents are highly likely, the magnitude/severity is typically limited, the warning time is less than 6 hours and the duration is usually less than 6 hours. These factors resulted in a CPRI rating of 3.1. The highest rating a hazard can result in using this method is 4.

## Vulnerability

The estimation of potential exposure to a hazardous material incident involving extremely hazardous substances (EHS) is accomplished by intersecting the human and facility assets with the point source and transportation corridor hazard areas. Transportation corridors identified include all Interstates, US, State and County roads. For the purpose of this plan, the risk exposure to EHS substances was determined by plotting the point facilities together with the transportation corridors and offsetting those locations with a one-mile buffer zone. All areas within one-mile buffer zone are assumed to be in a "high" hazard area. Structural losses due to EHS incidents are usually minor and are primarily focused on clean-up and decontamination. No readily available information exists for estimating loss-to-exposure ratios, therefore it is conservatively estimated that no more than 0.05% of the exposed structure values will be realized in actual loss exposure. Economic losses are unavailable at this time, it is assumed that state impacted facilities will be unproductive for 7 days.

In summary, \$574,000 in point source and transportation corridor EHS incident losses to state identified assets are estimated for the State of Arizona (Table 5.4.6.a). It is recognized that EHS incidents typically occur in a



single localized area and do not impact an entire community or state at one time. However, these numbers are representative of a collective state-wide exposure.

The primary concern with EHS incidents is the human exposure, wherein a total population of 3,292,821 people, or 100% of the total State population, is potentially exposed to point source and/or transportation corridor EHS incidents (Table 5.4.6.b). The potential for deaths and injuries are directly related to many factors including the type of chemical spilled, the prevailing wind pattern and speed, air temperature, humidity, and the response time. The potential for death and injury is highly likely given a large enough incident and proximity to populations. For any incident, displacement of people for at least one or more days is highly probable.

For the local risk assessment summary, Table 5.4.6.c combines asset and predominantly HAZUS information for the estimated losses as reflected in local plans. The potential total number of facilities in the hazard areas is 2,509,746 at a replacement cost of \$484 billion. The estimated losses for hazmat areas are approximately \$322 million.

- In August 2000, Central Garden Supply, in South Phoenix. Incompatible chemicals stored in close proximity caught fire. Multi-jurisdictional response. Still in litigation. The cost in damages was \$100,000,000.
- In August 2000, City of Phoenix experienced a material that was releasing from a bag of containers of pool chemicals due to a fire during the night. The cause of the fire is unknown. Five people were injured.

Table 5.4.6.a: Summary of State-Owned asset inventory loss estimates based on Hazardous Materials Incidents					
Jurisdiction	Impacted Facilities		Estimated (x \$1,000)		
	Total	Percentages	Replacement Cost	Structure Loss	Total Loss
<b>High Hazardous Materials Incidents (One-Mile Buffer)</b>					
<b>Statewide Totals</b>	<b>3,883</b>	<b>100.00%</b>	<b>\$5,744,150</b>	<b>\$574</b>	<b>\$574</b>
Apache	114	2.94%	\$349,023	\$35	\$35
Cochise	114	2.94%	\$16,128	\$2	\$2
Coconino	387	9.97%	\$541,898	\$54	\$54
Gila	123	3.17%	\$52,465	\$5	\$5
Graham	190	4.89%	\$130,425	\$13	\$13
Greenlee	34	0.88%	\$2,127	\$0	\$0
La Paz	102	2.63%	\$435,255	\$44	\$44
Maricopa	1,134	29.20%	\$1,389,185	\$139	\$139
Mohave	166	4.28%	\$433,639	\$43	\$43
Navajo	162	4.17%	\$454,863	\$45	\$45
Pima	602	15.50%	\$573,570	\$57	\$57
Pinal	443	11.41%	\$511,321	\$51	\$51
Santa Cruz	29	0.75%	\$37,330	\$4	\$4
Yavapai	177	4.56%	\$365,825	\$37	\$37
Yuma	106	2.73%	\$451,098	\$45	\$45



Ranking of Vulnerable Communities	
Hazardous Materials Incidents	
County	Community
Yuma	Yuma City
Pinal	Apache Junction
Navajo	Winslow
Yuma	Somerton
Yavapai	Cottonwood
Yavapai	Prescott
Graham	Safford
Santa Cruz	Nogales
Pinal	Casa Grande
Pinal	Florence



State Facilities Located in the Hazardous Materials Incident Hazard Area by Jurisdiction															
	AC	DOC	DOA	DES	DEQ	FAIR	GF	HS	HIS	ASLD	MIL	DOT MVD	PARKS	PofE	PS
Apache Junction															2
Avondale												8			
Benson															1
Bullhead City				1								5			
Camp Verde												9	7		
Casa Grande											3	15			
Chandler				1								5			
Chino Valley												2			
Coolidge											3	8			
Cottonwood												4	19		
Douglas	25			1					2		6	3			
Flagstaff	93			2			2		5	2	3	9	4		7
Florence		225									31		2		
Fredonia												2		2	
Gila Bend															11
Glendale	1										8				
Globe				1								14			
Holbrook												34			3
Jerome															
Kingman			1	1			5				4	32			3
Lake Havasu City												5			
Mammoth				3											
Mesa							3				11	30			
Nogales	1			1							2	9	2	2	2
Park												4	3	3	1
Payson												25			4
Peoria												2			
Phoenix	32	65	81	19	5	34	96	41		2	89	41			31
Pinetop							10								
Prescott				1								20			4
Prescott Valley											3	15			
Quartzsite												17			18
San Luis													1	1	
Scottsdale												4			
Show Low											6	11			4
Sierra Vista				1								4			2
Snowflake															
Springerville												3	3	3	
Superior												9			
Surprise												3			
Tempe	203											3			
Tombstone									1		2	1			
Tucson	268			1					4		9				5
Wellton															1
Wickenburg												11			
Willcox															1
Williams												14			1
Winslow				1								11			2
Youngtown			5												
Yuma				1			4		4		4	27	16	5	4

AC: academic, DOC: Dept of Corrections, DOA: Dept of Administration, DES: Dept of Economic Security, DEQ: Dept of Environmental Quality, Fair: Fair/Coliseum, GF: Game & Fish, HS: Health Svcs, HIS: Historical Site, ASLD: State Land Dept., MIL: military, DOT/MVD: Dept of Transportation/Motor Vehicles, Parks: Board of Parks, PofE: Port of Entry, PS: Public Safety



Table 5.4.6.b: County population sectors exposed to Hazardous Materials Incidents									
Jurisdiction	Population			Population over 65 yrs of age			Population under 18 yrs of age		
	Total	Exposed	Percentage Exposed	Total	Exposed	Percentage Exposed	Total	Exposed	Percentage Exposed
High HAZMAT Hazard (One-Mile Buffer)									
Statewide Totals	5,881,719	3,292,821	55.98%	667,760	389,153	58.28%	1,366,714	762,294	55.78%
Apache	66,601	14,269	21.42%	5,741	1,319	22.98%	26,722	5,555	20.79%
Cochise	125,933	61,596	48.91%	17,359	9,089	52.36%	30,985	15,447	49.85%
Coconino	123,505	76,329	61.80%	8,150	4,506	55.28%	33,424	19,052	57.00%
Gila	51,822	26,437	51.01%	10,154	5,300	52.20%	12,881	6,581	51.09%
Graham	34,520	18,481	53.54%	3,995	2,362	59.13%	10,102	5,021	49.71%
Greenlee	7,803	3,698	47.40%	840	341	40.55%	2,693	1,381	51.29%
La Paz	19,383	6,102	31.48%	5,085	1,221	24.01%	4,156	1,609	38.72%
Maricopa	3,601,880	2,248,446	62.42%	358,963	246,244	68.60%	827,999	511,752	61.81%
Mohave	181,965	98,014	53.86%	31,702	17,368	54.79%	35,823	19,755	55.14%
Navajo	102,877	41,110	39.96%	9,757	4,218	43.24%	34,523	13,271	38.44%
Pima	934,680	364,794	39.03%	119,489	46,353	38.79%	207,895	84,859	40.82%
Pinal	216,255	125,263	57.92%	29,182	18,348	62.87%	45,085	27,604	61.23%
Santa Cruz	43,485	25,428	58.48%	4,104	2,571	62.64%	12,888	7,846	60.88%
Yavapai	192,791	80,163	41.58%	36,814	15,734	42.74%	35,402	15,011	42.40%
Yuma	178,218	102,691	57.62%	26,425	14,179	53.66%	46,136	27,549	59.71%



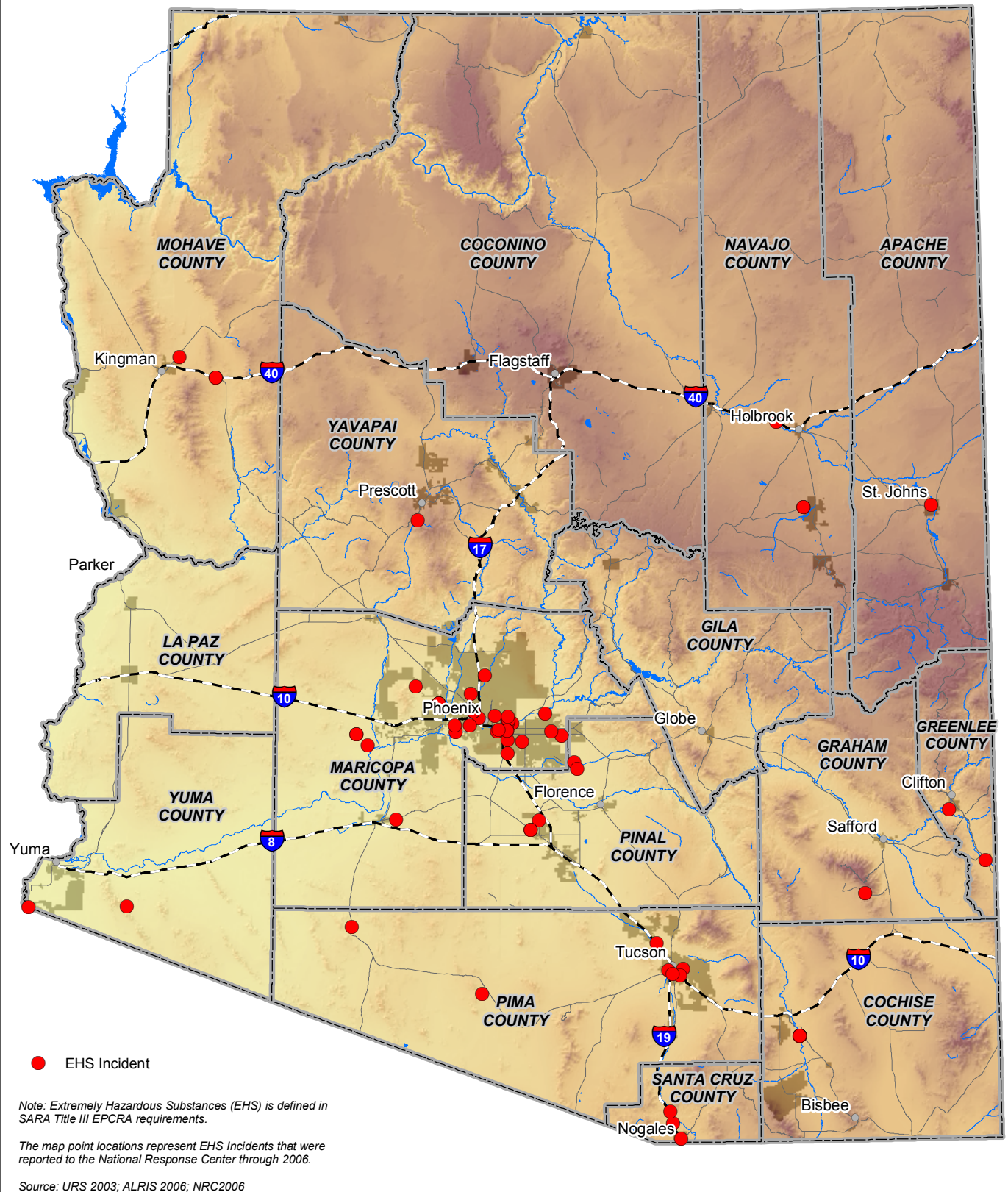
Table 5.4.6.c: Summary of Local Risk Assessment & Loss Estimates based on Hazardous Materials Incidents			
	Total Assets \$ (Assets +HAZUS) x \$1,000	# of Facilities Impacted (Assets + HAZUS)	Estimated Loss (Assets +HAZUS)
<b>HAZMAT Hazard</b>			
<b>Statewide Totals</b>	<b>\$97,166,826</b>	<b>605,277</b>	<b>\$270,908,000</b>
Apache	\$10,786,483	20,394	\$14,700,000
Cochise	-----	-----	-----
Coconino	-----	-----	-----
Gila	\$6,232,803	21,429	\$3,830,000
Graham	-----	-----	-----
Greenlee	\$6,416,683	1,840	\$660,000
La Paz	\$2,473,941	12,482	\$459,000
Maricopa	\$371,640,308	1,825,522	-----
Mohave	-----	-----	-----
Navajo	\$10,454,560	32,606	\$81,500,000
Pima	\$12,800,000	306,716	-----
Pinal	\$14,942,676	70,984	\$75,400,000
Santa Cruz	\$2,846,390	9,955	\$359,000
Yavapai	\$2,916,181	1,754	\$38,000,000
Yuma	\$27,297,109	127,117	\$56,000,000
----- Denotes lack of available information for assessment.			

#### Sources:

National Fire Protection Association, 2002. "Fire Investigation Summary, Warehouse, Phoenix, Arizona, August 2, 2000." <http://www.nfpa.org/PDF/FIphoenixsum.pdf?src=nfpa>

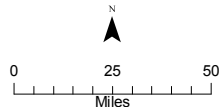
US Department of Transportation, September 2003. "Hazardous Materials Safety." <http://hazmat.dot.gov/risk.htm>

# State of Arizona



## Legend

- Major City
- ▭ County
- interstate
- Highway
- Major Streams
- Lakes
- Cities



August 2007



## State of Arizona Multi-Hazard Mitigation Plan

### Map 26 Extremely Hazardous Substances Incidents 1992 thru 2006

